

LISTING OF CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Claims 1-21 (Canceled):

Claim 22 (Currently Amended): A deficiency inspection method

based on a magnetic-particle inspection scheme, comprising the steps of:

irradiating an ultraviolet light on a surface of a specimen on which a magnetic particle is coated;

picking up an image of a solution containing fluorescent magnetic powder applied on a surface of a specimen by using a color video camera through a filter which filters the ultraviolet light;

detecting a deficiency candidate on said surface by using a green (G) signal component of said image acquired by said color video camera; and

displaying an image of said detected deficiency candidate on a screen; and
storing the displayed image in a memory.

Claim 23 (Currently Amended): The deficiency inspection method

according to claim 22, wherein in the step of detecting, at the deficiency candidate on said surface is detected by using information of luminance of said green (G) signal component of said image.

Claim 24 (Currently Amended): A deficiency inspection method based on a magnetic-particle inspection scheme, comprising the steps of:

irradiating ultraviolet rays on a surface of a specimen to which a solution containing fluorescent magnetic powder is applied;

picking up an image of said ~~surface~~said surface irradiated with said ultraviolet rays by a color video-camera through a filter which filters said ultraviolet rays; and

displaying an image acquired by said color video-camera on a screen in nearly the same state as an image acquired by visually observing said surface irradiated with said ultraviolet rays.

Claim 25 (Currently Amended): A deficiency inspection method based on a magnetic-particle inspection scheme, comprising the steps of:

irradiating ultraviolet rays on a surface of a specimen to which a solution containing fluorescent magnetic powder is applied;

picking up an image of said surface irradiated with said ultraviolet rays by a color video-camera via an ultraviolet-rays cutting filter;

extracting ~~a deficiency and~~ deficiency candidates from an image acquired by said color video-camera; and

displaying on a screen images of ~~said~~the extracted deficiency and deficiency candidates.

Claim 26 (Currently Amended): A deficiency inspection method based on a penetrant inspection scheme, comprising the steps of:

picking up an image of a surface of a specimen by using a color video camera;

converting RGB data of the picked-up image to chromaticity and luminance;

and

detecting a deficiency candidate on said surface by using information about of said chromaticity and luminance obtained converted from said RGB data of the picked-up image ~~picked up by said color video camera.~~

Claim 27 (Currently Amended): A deficiency inspection method based on a penetrant-inspection scheme, comprising the steps of:

illuminating a surface of a specimen with polarized light;

picking up an image of said surface illuminated with said polarized light by a color video-camera via a polarization filter, wherein said color camera is calibrated by using camera calibration color chart for inspection;

extracting deficiency candidates from said image acquired by said color video camera; and

displaying images of said extracted deficiency candidates on a screen.

Claim 28 (Currently Amended): ~~The~~A deficiency inspection method for magnetic-particle-inspection or penetrant-inspection, comprising the steps of:

picking up an image of a surface of a specimen by a color video-camera with positional information of a visual field of said color video-camera which is calibrated by using camera calibration color chart for inspection;

detecting deficiency candidates in said surface by processing a color video signal of said image acquired by said color video camera;

displaying images of said detected deficiency candidates on a screen together with said positional information of said visual field; and

extracting true defect among said defect candidate by using information of feature characteristics.

Claim 29 (Previously Presented): The deficiency inspection method according to claim 28, wherein said positional information of said visual field is originated from a scale arranged in said visual field.

Claim 30 (Currently Amended): The deficiency inspection method according to any one of claims 22-29, wherein said image of said surface is picked up by said color video camera over plural visual fields.

Claim 31 (Currently Amended): A deficiency inspection method for magnetic-particle-inspection or penetrant inspection, comprising the steps of:

illuminating a specimen with light;

taking an image of a surface of athe specimen by a camera through a filter which filters the light reflected from said surface by the illumination;

detecting deficiency candidates in said surface from said image taken by said camera;

displaying images of said extracted deficiency candidates on a screen; and

distinguishing a pseudo deficiency among said images of said extracted
deficiency candidates displayed on said screen.

Claim 32 (Currently Amended): A deficiency inspection method
comprising the steps of:

picking up an image of a surface of a specimen by image pickup means;
detecting deficiency candidates ~~in~~on said surface among said image acquired
by said image pickup means;
displaying images of said-detected deficiency candidates on a screen; and
storing said ~~displayed image~~images of said detected deficiency candidates
with information of feature characteristics of said deficiency candidatecandidates in a
memory.

Claim 33 (Currently Amended): A deficiency inspection apparatus for
magnetic-particle-inspection or penetrant inspection, comprising:

illumination means for illuminating a surface of a specimen on which a
magnetic particle is coated;
image pickup means for picking up an image of said surface by a color video
camera through a filter;
deficiency-candidate detecting means for detecting deficiency candidates and
their features in shape from a green (G) signal component of said image picked up
by said image pickup means; and
display means for displaying images of said deficiency candidates detected by
said deficiency-candidate detecting means.

Claim 34 (Previously Presented): The deficiency inspection apparatus according to claim 33, wherein said illumination means has an ultraviolet-rays illuminating section for illuminating ultraviolet rays onto said surface of said specimen, and a white-light illuminating section for illuminating white light onto said surface of said specimen.

Claim 35 (Currently Amended): A deficiency inspection apparatus, comprising:

illumination means for illuminating a surface of a specimen;

image pickup means for picking up an image of said surface by a color video camera, which is calibrated by using camera calibration color chart for inspection;

magnetic-particle-inspection-originated deficiency-candidate extraction means for extracting magnetic-particle-inspection originated deficiency candidates in said surface from said image of said surface picked up by said image pickup means;

penetrant-inspection-originated deficiency-candidate extraction means for extracting penetrant-inspection-originated deficiency candidates in said surface from said image of said surface picked up by said image pickup means; and

display means for displaying images of said deficiency candidates detected by said magnetic-particle-inspection-originated deficiency-candidate extraction means or said penetrant-inspection-originated deficiency-candidate extraction means.

Claim 36 (Currently Amended): A deficiency inspection apparatus for magnetic-particle-inspection or penetrant inspection, comprising:

an illuminator which illuminates a surface of a specimen;
a camera which picks up an image of said surface;
a deficiency-candidate detector which detects deficiency candidates on said surface from said image of said surface picked up by said camera by using a green (G) signal component of said image;
a storage section which stores images of said deficiency candidates detected by said deficiency-candidate detector; and
a display unit which displays information of said images of said deficiency candidates stored in said storage section on a screen.

Claim 37 (Currently Amended): A deficiency inspection apparatus, comprising:

ultraviolet-rays irradiation means for irradiating ultraviolet rays ~~to~~onto a surface of a specimen to which a solution containing fluorescent magnetic powder is applied;

image pickup means for picking up an image of said surface irradiated with said ultraviolet rays by a color video-camera through a filter which filters said ultraviolet rays; and

display means for displaying said image of said surface picked up by said image pickup means on a screen in nearly the same state as an image acquired by said visual observation.

Claim 38 (Currently Amended): A deficiency inspection apparatus based on a probing scheme, comprising:

~~ultraviolet-rays irradiation~~illuminating means for irradiating ~~ultraviolet rays~~
~~to~~illuminating light on a surface of a specimen to which a solution containing
~~fluorescent magnetic powder~~ penetrant inspection treatment is applied;

image pickup means for picking up an image of said surface
~~irradiated~~illuminated with said ~~ultraviolet-rays~~light by a color video camera ~~via an~~
~~ultraviolet-rays cutting filter, which is calibrated by using camera calibration color~~
chart for inspection;

converter means for converting RGB data of the image picked-up by said
image pickup means to chromaticity and luminance;

deficiency-candidate detecting means for detecting deficiency candidates and
~~features thereof based on shape from~~by using information of said chromaticity and
luminance of said image of said ~~surface picked up by said image pickup means~~; and

display means for displaying images of said deficiency candidates detected by
said deficiency-candidate detecting means.

Claim 39 (Currently Amended): A deficiency inspection apparatus,
comprising:

~~ultraviolet-rays irradiation~~illuminating means for irradiating ~~ultraviolet rays~~
~~to~~illuminating light on a surface of a specimen to which a solution containing
~~fluorescent magnetic powder~~penetrant-inspection treatment is applied;

image pickup means for picking up a ~~fluorescent~~an image of said surface
~~irradiated by said ultraviolet rays emanated from said ultraviolet-rays~~
~~irradiation~~illuminated by said illuminating means by a color ~~video~~ camera;

converter means for converting RGB data of the image picked-up by said image pickup means to chromaticity and luminance;

deficiency-candidate detecting means for detecting deficiency candidates on said surface using information of luminance of a green (G) signal component in a color image signal output from from said image picked-up by said color camera of said image pickup means; and

display means for displaying images of said deficiency candidates detected by said deficiency-candidate detecting means; and

memory means for storing displayed images with data of chromaticity and luminance obtained by said converter means.

Claim 40 (Currently Amended): A deficiency inspection apparatus, comprising:

illumination means for illuminating a surface of a specimen to which a penetrant is temporarily applied with white light;

image pickup means for picking up an image of said surface by a color video camera which is calibrated by using camera calibration color chart for inspection camera;

magnetic-particle-inspection-originated deficiency-candidate detecting means for detecting magnetic-particle-inspection originated deficiency candidates on said surface from a green (G) signal component of said image of said surface picked up by said image pickup means;

penetrant-inspection-originated deficiency-candidate detecting means for detecting penetrant-inspection-originated deficiency candidates on said surface from said image picked up by said image pickup means; and

display means for displaying images of said deficiency candidates detected by said magnetic-particle-inspection-originated deficiency-candidate detecting means or said penetrant-inspection-originated deficiency-candidate detecting means.

Claim 41 (Currently Amended): The deficiency inspection apparatus according to any one of claims 33 to 40, ~~wherein~~further comprising positional information display means arranged in a visual field of said color camera, for displaying positional information of a~~said~~ visual field of said color ~~video~~ camera ~~is~~ arranged in said visual field.

Claim 42 (Previously Presented): The deficiency inspection apparatus according to claim 40, wherein said positional information display means is a scale.